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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
HIROMI MATSUMURA, ET AL.	: EXAMINER: FOGARTY, C.
SERIAL NO: 10/551,672	:
FILED: SEPTEMBER 30, 2005	: GROUP ART UNIT: 1793
FOR: SPUTTERING TARGET AND METHOD FOR PREPARATION THEREOF	:

DECLARATION UNDER 37 C.F.R. § 1.132

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

I, Katsutoshi Takagi, hereby declare and state as follows:

1. That I am familiar with the contents of the above referenced U.S. patent application.

2. That in 1992 I received a Masters degree in Engineering from the School of Engineering at Tohoku University in Japan.

3. That since April of 1992 I have been employed at Kobe Steel. Ltd., which is affiliated with Kobelco Research Institute, Inc., the assignee of the above referenced U.S. patent application. I was on loan to Kobelco Research Institute, Inc. from April of 2000 to June of 2002, and also from April of 2005 to the present date.

4. That I currently hold the position of Senior Engineer in the Material and Process Development Section, Technical Engineering Department, Sputtering Target Division, of Kobelco Research Institute, Inc.

5. That I supervised the performance of tests in which different Al-Ti alloy sputtering targets were manufactured by the techniques of: (1) vacuum melting, (2) powder sintering, and (3) spray forming.

6. That the attached Fig. 1 is an image showing the Electron Probe Micro Analysis (EPMA) mapping of the Ti distribution in the Al-Ti alloy sputtering targets (1)-(3). Color in the pictures shows the concentration of Ti. Low Ti concentration is shown as black, and high Ti concentration is shown as white.

7. That the attached Fig. 2 is an enlargement of the Al-Ti alloy sputtering target (1) manufactured by vacuum melting. According to Fig. 2, the black area and white area are clearly separated, and the Ti (shown as white area) is localized.

8. That the attached Fig. 3 is an enlargement of the Al-Ti alloy sputtering target (2) manufactured by powder sintering. According to Fig. 3, the black area and white area are clearly separated, and the Ti is remarkably localized compared to Fig. 2.

9. That the attached Fig. 4 is an enlargement of the Al-Ti alloy sputtering target (3) manufactured by spray forming. According to Fig. 4, the Ti is uniformly distributed.

10. That the attached Fig. 5 shows the Ta distribution in an Al-Ta alloy sputtering target manufactured by spray forming. According to Fig. 5, Ta, shown as a blue area, is uniformly distributed.

11. That the attached Fig. 6 shows the Cr distribution in an Al-Cr alloy sputtering target manufactured by spray forming. According to Fig. 6, Cr, shown as a blue area, is uniformly distributed.

12. That the attached Fig. 7 is a micrograph showing the microstructure of the Al-Ti alloy sputtering targets (1)-(3), observed by an optical microscope.

13. That the attached Fig. 8 shows the microstructure, at four different magnifications, of an Al-Ti alloy sputtering target manufactured by vacuum melting, after etching to enhance the clarity of the structure. According to Fig. 8, huge grains are observed.

14. That the attached Fig. 9 shows the microstructure, at four different magnifications, of an Al-Ti alloy sputtering target manufactured by powder sintering, after etching to enhance the clarity of the structure. According to Fig. 9, huge grains and fine grains are observed.

15. That the attached Fig. 10 shows the microstructure, at four different magnifications, of an Al-Ti alloy sputtering target manufactured by spray forming, after etching to enhance the clarity of the structure. According to Fig. 10, only fine and uniform grains are observed. This is the evidence that structure is uniform.

16. That the attached Fig. 11 shows the microstructure, at four different magnifications, of an Al-Ta alloy sputtering target manufactured by spray forming, after etching to enhance the clarity of the structure. According to Fig. 11, only fine and uniform grains are observed. This is the evidence that structure is uniform.

17. That the attached Fig. 12 shows the microstructure, at four different magnifications, of an Al-Cr alloy sputtering target manufactured by spray forming, after etching to enhance the clarity of the structure. According to Fig. 12, only fine and uniform grains are observed. This is the evidence that structure is uniform.

18. I declare that all statement made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

19. Further declarant saith not.

Katsutoshi Takagi — December 10, 2009

Katsutoshi Takagi — Date

(1) Al-Ti alloy sputtering target manufactured by vacuum melting

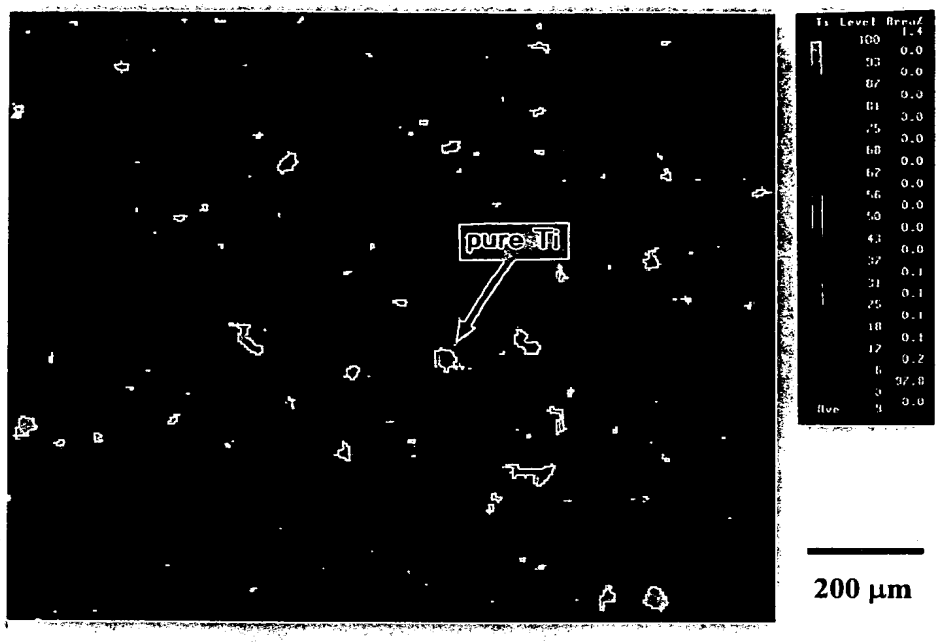
(2) Al-Ti alloy sputtering target manufactured by powder sintering

(3) Al-Ti alloy sputtering target manufactured by spray forming

Fig. 1 Ti distribution in Al-Ti alloy sputtering targets.

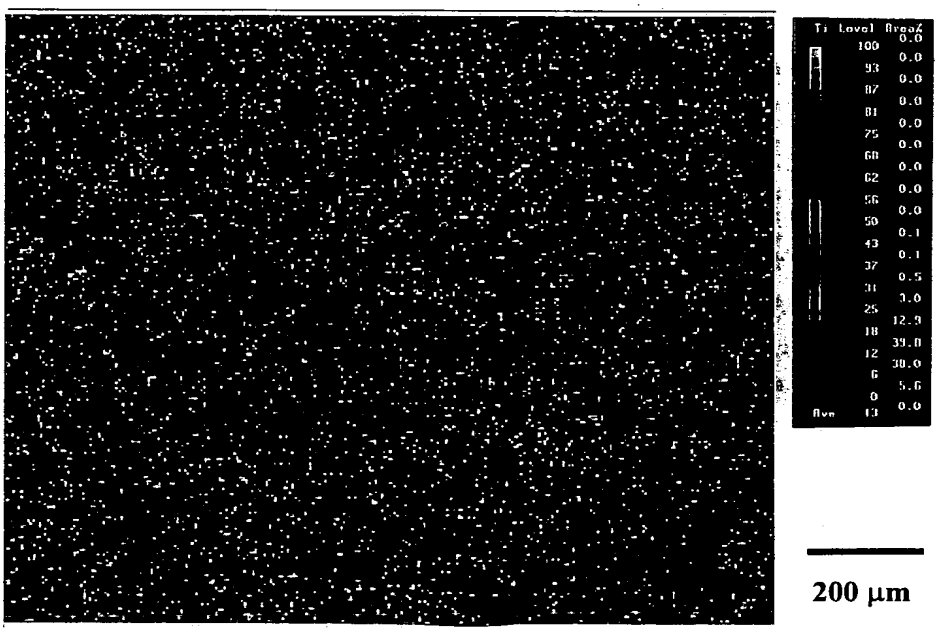
EPMA mapping of Ti

Fig. 2 Ti distribution in Al-Ti alloy sputtering targets manufactured by vacuum melting.



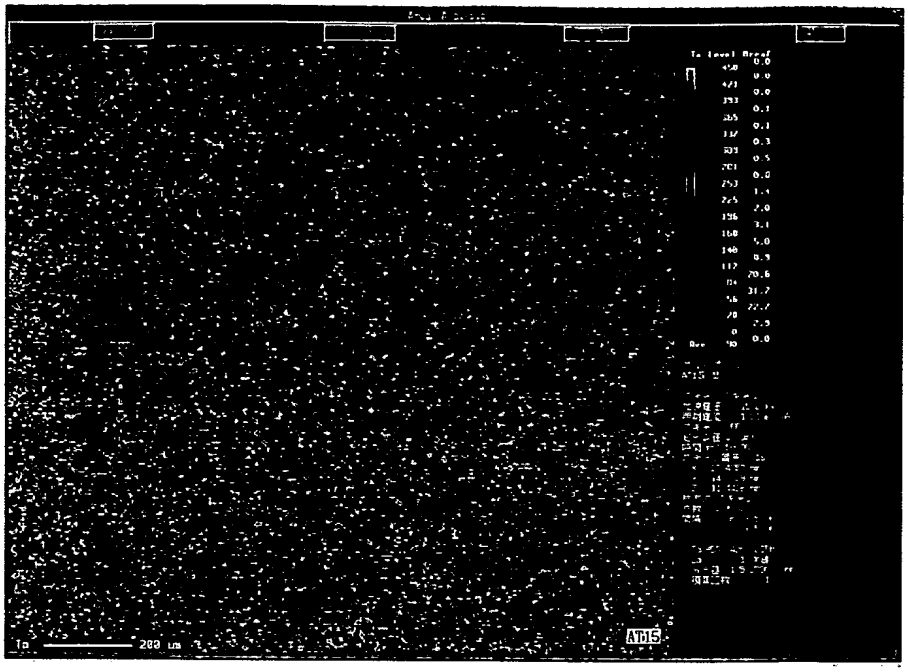
EPMA mapping of Ti

Fig. 3 Ti distribution in Al-Ti alloy sputtering targets manufactured by powder sintering.



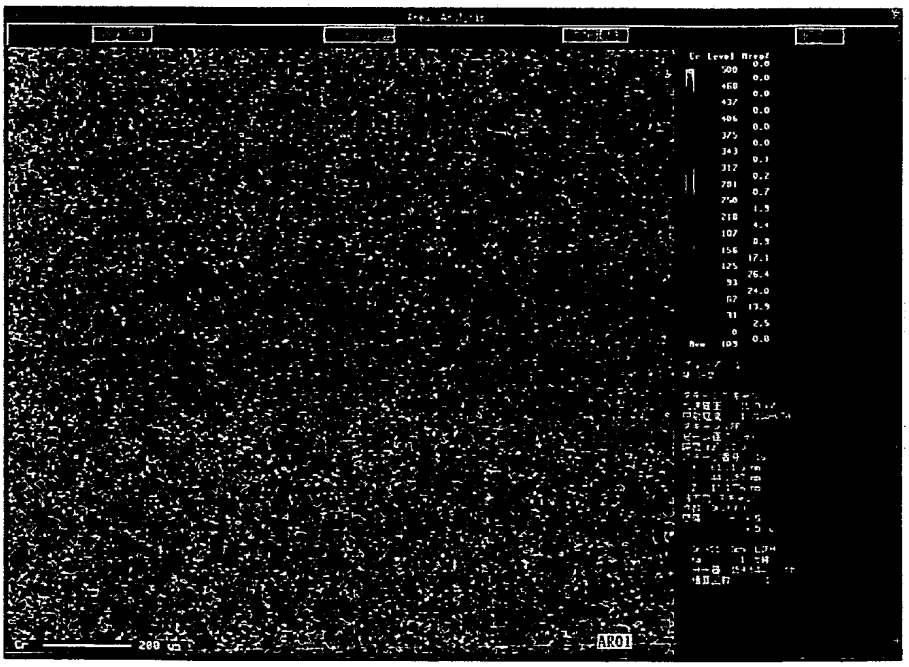
EPMA mapping of Ti

Fig. 4 Ti distribution in Al-Ti alloy sputtering targets manufactured by spray forming.



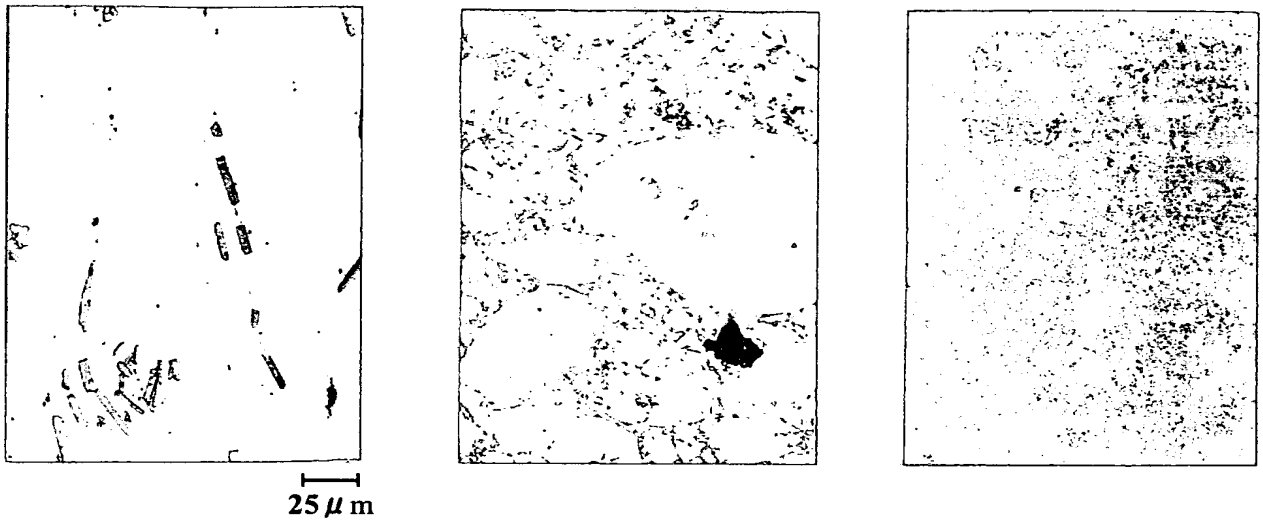
EPMA mapping of Ta

Fig. 5 Ta distribution in Al-Ta alloy sputtering targets manufactured by spray forming.



EPMA mapping of Cr

Fig. 6 Cr distribution in Al-Cr alloy sputtering targets manufactured by spray forming.



(1) Al-Ti alloy sputtering target manufactured by vacuum melting

(2) Al-Ti alloy sputtering target manufactured by powder sintering

(3) Al-Ti alloy sputtering target manufactured by spray forming

Fig. 7 Microstructure of Al-Ti alloy sputtering targets.

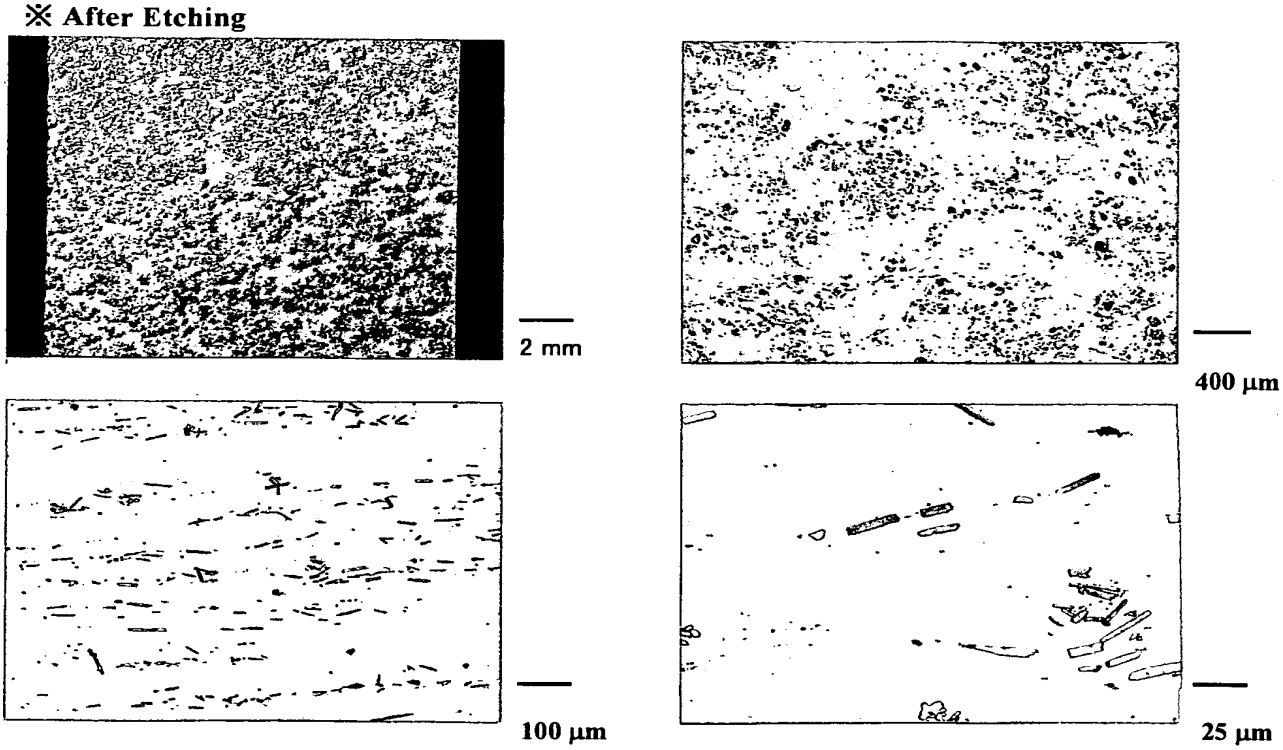


Fig. 8 Microstructure of Al-Ti alloy sputtering target manufactured by vacuum melting.

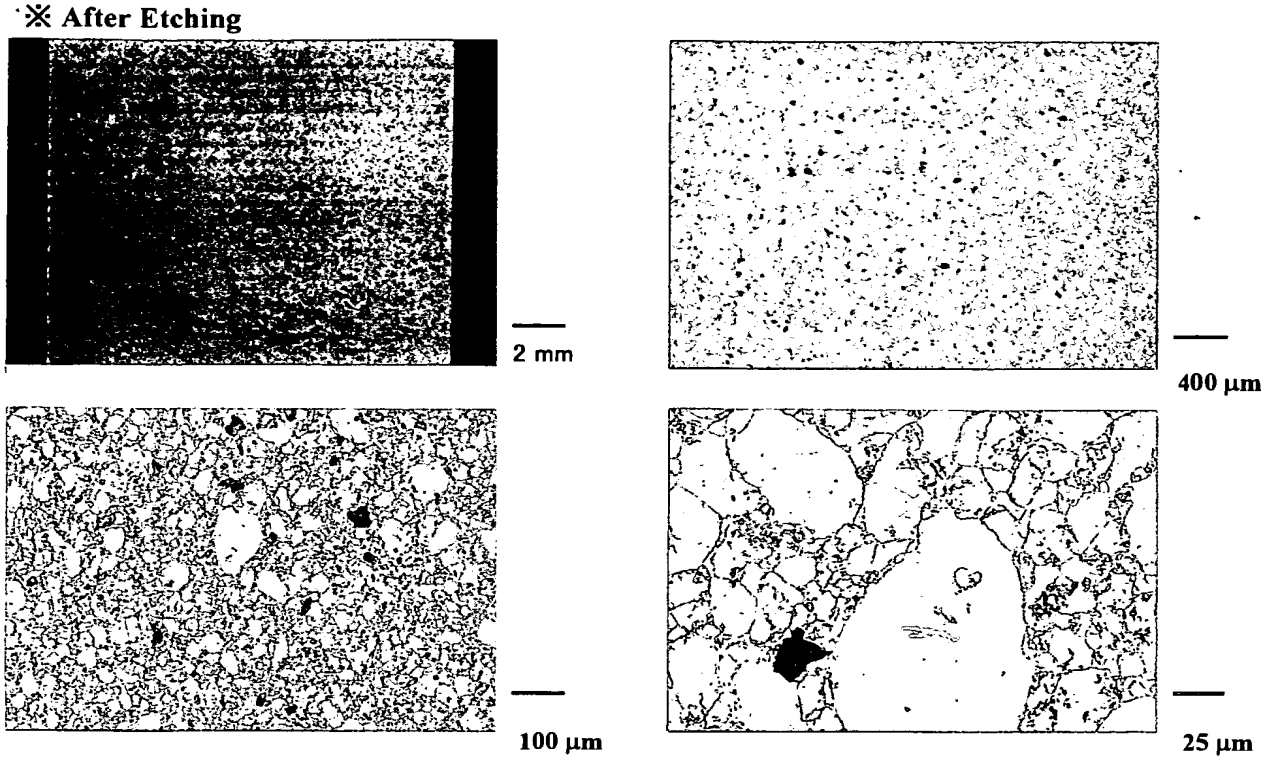


Fig. 9 Microstructure of Al-Ti alloy sputtering target manufactured by powder sintering.

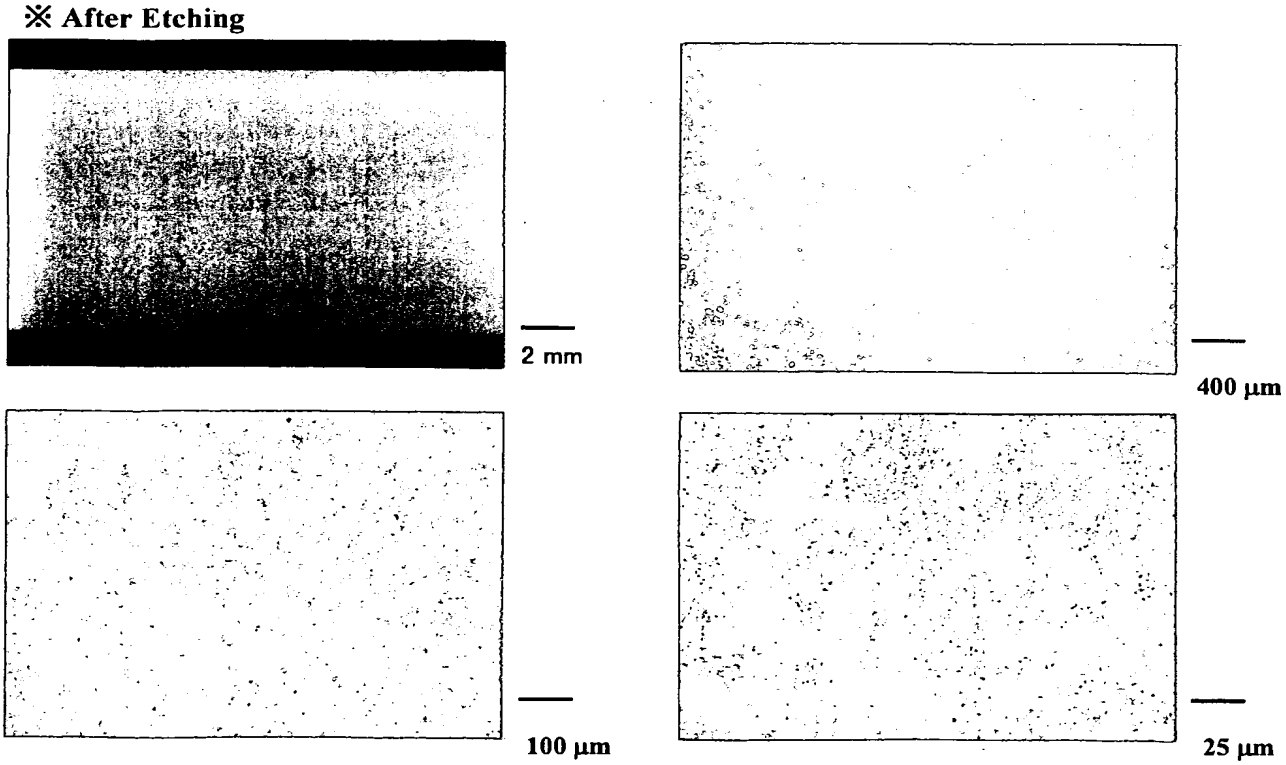


Fig. 10 Microstructure of Al-Ti alloy sputtering target manufactured by spray forming.

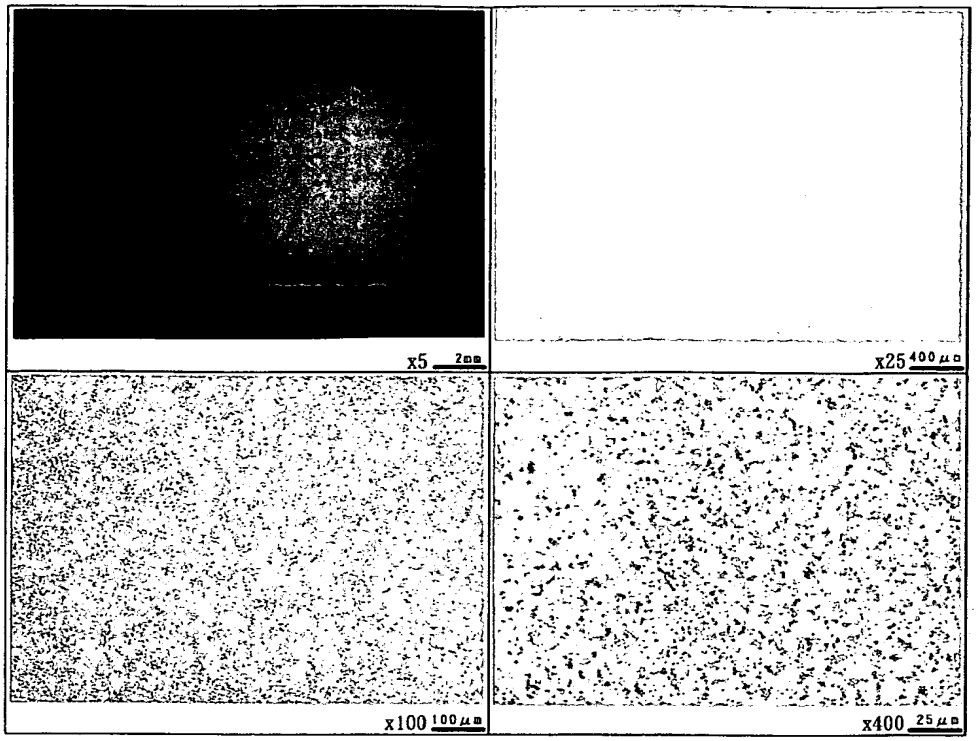


Fig. 11 Microstructure of Al-Ta alloy sputtering target manufactured by spray forming.

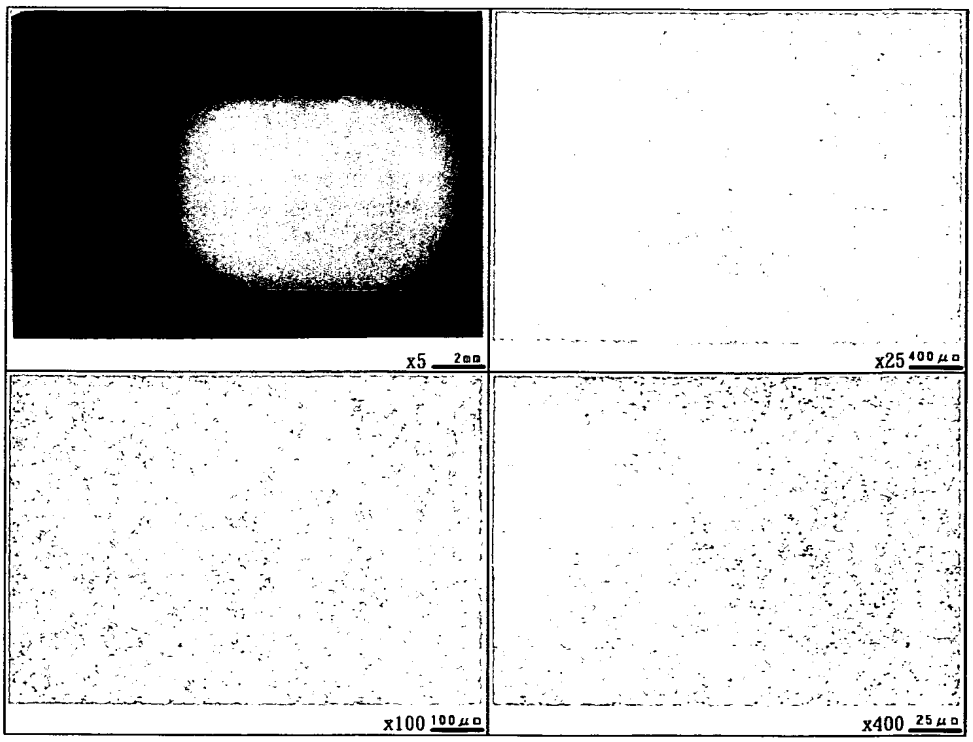


Fig. 12 Microstructure of Al-Cr alloy sputtering target manufactured by spray forming.